

1 Claims

3 1. Optical module with

- 4 - a circuit carrier (10);
- 5 - an unpackaged semiconductor device (12) flip-chip
- 6 mounted on the circuit carrier (10); and
- 7 - a lens unit (14; 16, 18, 20; 21) for projecting
- 8 electromagnetic radiation onto the semiconductor
- 9 device (12);
- 10 - wherein the lens unit (14; 16, 18, 20; 21)
- 11 comprises a lens holder (14) and a lens assembly
- 12 (16, 18, 20; 21) with at least one lens,
- 13 characterized in that
- 14 - the circuit carrier (10) has at least one thin
- 15 region (10a) and a thick region (10b) supporting
- 16 the thin region (10a).

18 2. Optical module according to claim 1,

19 characterized in that the lens holder (14) is
20 disposed in a supported manner in the thin region
21 (10a) of the circuit carrier (10).

23 3. Optical module according to claim 1 or 2,

24 characterized in that the semiconductor device (12)
25 is also disposed in or adjacent to a thin region
26 (10a) of the circuit carrier (10).

28 4. Optical module according to claims 1 to 3,

29 characterized in that the thick region (10b) is at
30 least partially U-shaped, L-shaped, F- or E-forked or
31 frame-shaped.

- 1 5. Optical module according to one of the preceding claims,
2 characterized in that the thick region (10b) is rigidly
3 implemented, e.g. as a multilayer printed circuit board
4 (PCB), or FR 4 circuit board.
5
- 6 6. Optical module according to one of the preceding claims,
7 characterized in that the thin region (10a) is
8 implemented by recessing or milling out.
9
- 10 7. Optical module according to one of claims 1 to 4,
11 characterized in that the thin region (10a) and the
12 thick region (10b) are implemented as a molded
13 interconnect device (MID) with integrated conductor
14 tracks.
15
- 16 8. Optical module according to one of claims 1 to 5,
17 characterized in that the thin region (10a) is
18 implemented as a flexible PCB and the thick region (10b)
19 as a rigid PCB.
20
- 21 9. Optical module according to one of the preceding claims,
22 characterized in that support elements (39) are at least
23 partially implemented on the lens holder (14).
24
- 25 10. Optical module according to one of claims 1 to 9,
26 characterized in that the lens holder (14) is connected,
27 in particular glued, laser-welded, screwed or riveted,
28 to the circuit carrier (10), preferably adjacently to
29 the support elements (39).
30
- 31 11. Optical module according to one of claims 1 to 9,
32 characterized in that the thick second region (10b) of
33 the circuit carrier (10) is part of the lens unit or

1 more precisely of the lens holder (14), the lens holder
2 (14) being preferably an MID (molded interconnect
3 device) with integrated conductor tracks.
4

5 12. Optical module according to one of the preceding claims,
6 characterized in that

- 7 - the semiconductor device (12) is disposed on the
8 side of the circuit carrier (10) facing away from
9 the lens unit; and
- 10 - the thin region (10a) in the circuit carrier (10)
11 has an opening (24) through which the
12 electromagnetic radiation is projected by the lens
13 assembly (16, 18, 20; 21) onto the semiconductor
14 device (12).

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16 13. Optical system with an optical module according to one
17 of the preceding claims.
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